AMENDMENTS TO THE CLAIMS

Please **CANCEL** claims 10-13, 16, 18, 31-57, 61-66, 68, 71, and 72 without prejudice or disclaimer.

Please **AMEND** claims 2, 9, 17, 24-28, 30, 58, 60, 69, and 70 as shown below.

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Original) A resonator cavity comprising at least one gain medium and end reflectors which define together longitudinal modes of light in the cavity, the cavity further comprising an intra-cavity beam coupler assembly configured to split light impinging thereon into a predetermined number of spatially separated light channels, and to cause phase locking and at least partial coherent combining of the light channels, which have common longitudinal and transverse modes, in a double pass through the beam coupler assembly, the resonator cavity being configured and operable to produce at least one output combined light channel of a predetermined intensity profile.

2. (Currently Amended) The resonator cavity of Claim 1, wherein the light channels are associated with ~~the~~ <u>a</u> single gain medium.

3. (Original) The resonator cavity of Claim 1, wherein the beam coupler assembly is configured as an interferometric coupler assembly.

4. (Original) The resonator cavity of Claim 3, wherein the interferometric coupler assembly comprises a plane parallel plate, each of front and rear facets of the plate having a predetermined pattern formed by regions of predetermined transmission or reflectivity, said plane parallel plate having a predetermined thickness *d* and being oriented with respect to a light propagation cavity axis at a predetermined angle defining a certain angle α of light incidence onto the plate so as to ensure said splitting and said at least partial coherent combining of the light channels in the double pass through the plate.

5. (Original) The resonator cavity of Claim 4, wherein for the incident angle α, the thickness *d* of the plate is determined as:

$$d = x_0 / \{ 2 \cos\alpha \; tg[\arcsin(\sin\alpha / n)] \}$$

wherein x_0 is a distance between propagation axes of the light channels, and *n* is a refractive index of a material of the plate, thereby providing for matching the distance between the light channels so as to enable an optimal overlap between the light channels and their parallel propagation after exiting the beam coupler assembly.

6. (Original) The resonator cavity of Claim 3, wherein the beam coupling assembly is configured to provide for phase locking and partial coherent combining of the light, the output being in the form of a single large mode intensity profile with a well defined phase.

7. (Original) The resonator cavity of Claim 5, wherein each of the front and rear facets of the plate has the predetermined pattern formed by regions of predetermined uniform transmission or reflectivity.

8. (Original) The resonator cavity of Claim 7, wherein the front facet includes a substantially transmitting region and a region of the predetermined partially light transmitting property, and the rear facet includes a region of said predetermined partially light transmitting property and a substantially transmitting region, the dimensions of the regions on the front and rear facets and the orientation of the plane parallel plate being such as to allow light passage through the plate to the partially transmitting region on the rear facet, where light is reflected from said partially transmitting region of the rear facet towards the partially transmitting region of the front facet, which reflects light to the transmitting region on the rear facet.

9. (Currently Amended) The resonator cavity of Claim 8, wherein ~~the~~ <u>said end reflectors comprise an</u> output end reflector [[is]] accommodated in an optical path of light emerging from the rear facet.

10-13. (Canceled)

14. (Original) The resonator cavity of Claim 1, comprising an intra-cavity aperture arrangement configured to select, in at least one light channel, a predetermined transverse mode content corresponding to said predetermined intensity profile.

15. (Original) The resonator cavity of Claim 14, wherein the aperture arrangement has one of the following configurations: (a) comprises multiple apertures each associated with the respective one of said light channels propagating between the rear end reflector and the beam coupler assembly; (b) comprises a single aperture associated either with one of the light channels propagating between the rear end reflector and the beam coupler assembly or with one combined channel propagating between the beam coupler assembly and the output end reflector; and (c) comprises a large aperture associated with all the light channels propagating between the rear end reflector and the beam coupler assembly.

16. (Canceled)

17. (Currently Amended) The resonator cavity of Claim 14, wherein the beam coupling assembly is configured to provide coherent combining of the light channels to produce ~~the~~ a single output combined channel.

18. (Canceled)

19. (Original) The resonator cavity of Claim 17, wherein the beam coupler assembly includes at least one simple beam splitter/combiner.

20. (Original) The resonator cavity of Claim 17, comprising *N* gain media producing *N* light channels, respectively, said beam coupler assembly including *(N-1)* simple beam splitter/combiners.

21. (Original) The resonator cavity of Claim 14, wherein the beam coupler assembly is configured as an interferometric coupler assembly.

22. (Original) The resonator cavity of Claim 21, wherein the interferometric coupler assembly comprises a plane parallel plate, each of front and rear facets of the plate having a predetermined pattern formed by regions of predetermined transmission or reflectivity, the plane parallel plate having a predetermined thickness *d* and being oriented with respect to a light propagation cavity axis at a predetermined angle defining a certain angle α of light incidence onto the plate so as to ensure said splitting and said at least partial coherent combining of the light channels in the double pass through the plate.

23. (Original) The resonator cavity of Claim 22, wherein for the incident angle α, the thickness *d* of the plate is determined as:

$$d = x_0 / \{ 2 \cos\alpha \; tg[\arcsin(\sin\alpha / n)] \}$$

wherein x_0 is a distance between propagation axes of the light channels, and n is a refractive index of a material of the plate, thereby providing for matching the distance between the light channels so as to enable an optimal overlap between the light channels and their collinear propagation after exiting the beam coupler assembly.

24. (Currently Amended) The resonator cavity of ~~Claim 21~~ Claim 22, wherein the front facet includes a substantially light transmitting region, and a region formed by *(N-1)* different beam splitting sub-regions for *N* light channels, respectively, each *i*-th beam splitting sub-region, $i = 2, \ldots N$, having a reflectivity of *(1-1/i)* or transmittance of *1/i*, such that ~~the~~ a first light channel is substantially not affected by the front facet and the other *(N-1)* light channels are differently affected by said *(N-1)* beam splitting regions, respectively; and the rear facet includes a relatively large highly reflective region and a substantially light transmitting region, the dimensions of the regions on the front and rear facets and the orientation of the plane parallel plate being such as to allow light passage through the front facet to the highly reflective region of the rear facet where light is reflected towards the beam splitting region in ~~the~~ a front surface where it is partly reflected back to the highly reflective region on the rear facet.

25. (Currently Amended) The resonator cavity of Claim 24, wherein ~~the~~ said end reflectors comprise an output end reflector [[is]] accommodated in an optical path of light emerging from the rear facet.

26. (Currently Amended) The resonator cavity of Claim 24, wherein the beam coupling assembly is configured to provide full coherent combining of the light channels to produce ~~the~~ a single output combined channel, the output end reflector being accommodated in an optical path of light coming from the front facet.

27. (Currently Amended) The resonator cavity of ~~Claim 21~~ Claim 22, wherein ~~the~~ said end reflectors comprise an output end reflector is accommodated in an optical path of a light portion that is reflected from the front facet;

the front facet includes a region formed by *(N-1)* different beam splitting sub-regions for *N* light channels, respectively, each *i*-th beam splitting sub-region, $i = 2, \ldots N$, having a reflectivity of *(1-1/i)* or transmittance of *1/i*, said region of *(N-1)* sub-regions being surrounded by substantially light transmitting regions, such that ~~the~~ a first light channel is substantially not affected by the front facet and the other *(N-1)* light channels are differently affected by said *(N-1)* beam splitting regions, respectively; and the rear facet is highly reflective, the dimensions of the regions on the front facets and the orientation of the plane parallel plate being such as to allow light passage through the front facet to the highly reflective rear facet where light is reflected towards the beam splitting sub-region in ~~the~~ a front surface where it is partly reflected back to the highly reflective rear facet which reflects light to pass through the substantially light transmitting region on the front facet towards the output end reflector.

28. (Currently Amended) The resonator cavity of ~~Claim 21~~ Claim 27, wherein the substantially transmitting regions are formed by an anti-reflecting coating on the plate.

29. (Original) The resonator cavity of Claim 21, wherein the beam coupler assembly is oriented at a Brewster angle with respect to the cavity axis, and the input light has specific linear polarization.

30. (Currently Amended) The resonator cavity of ~~Claim 21~~ Claim 22, wherein the front facet of the plane parallel plate comprises ~~the~~ a single beam splitting sub-region, thereby producing two light channels.

31-57. (Canceled)

58. (Currently Amended) The resonator cavity of Claim 15~~(b)~~, wherein said single aperture has a diameter capable of carrying out one of the following: (i) selecting the lowest transverse TEM_{00} mode distribution, thereby enabling to impose this mode of said one light channel on one or more other light channels and the coherent combining of all the light channels by the beam coupler assembly; (ii) selecting a desired multiple-transverse-mode distribution, thereby enabling to impose the desired multiple-transverse-mode distribution of said one light channel on one or more other light channels and the coherent combining of all the light channels by the beam coupler assembly; and (iii) selecting a desired single high-order transverse mode

distribution, thereby enabling to impose the single high-order transverse-mode distribution of said one light channel on one or more other light channels and the coherent combining of all the light channels by the beam coupler assembly, the cavity further comprising a phase element.

59. (Original) The resonator cavity of Claim 58, wherein said one light channel is the output combined light channel.

60. (Currently Amended) The resonator cavity of Claim 15~~(a)~~, wherein each of the apertures has a diameter capable of carrying out at least one of the following: (i) selecting the lowest transverse TEM00 mode distribution; (ii) selecting a desired multiple-transverse-mode distribution; and (iii) selecting a desired single high-order transverse mode distribution.

61-66. (Canceled)

67. (Original) A resonator cavity comprising at least one gain medium and end reflectors which define together longitudinal modes of light in the cavity, the resonator cavity further comprising:

(a) a beam coupler assembly configured to split light impinging thereon into a predetermined number of spatially separated light channels, and to cause phase locking and at least partial coherent combining of the light channels, having common longitudinal and

transverse modes, in a double pass through the beam coupler assembly, to thereby produce at least one output combined light channel; and

(b) an aperture arrangement configured to select in at least one of the light channels, a predetermined transverse mode content that is desired at the cavity output.

68. (Canceled)

69. (Currently Amended) A beam coupler element ~~for use in a resonator cavity~~ for controlling light propagating through ~~the~~ <u>a</u> resonator cavity to provide an output light channel in the form of coherent addition of at least two light channels having common longitudinal modes, the beam coupler assembly comprising a plane parallel plate with its front and rear facets being patterned to have regions of predetermined transmission or reflectivities, wherein: the front facet includes a substantially transmitting region and *(N-1)* beam splitting regions for *N* light channels, respectively, each *i*-th beam splitting region, $i = 2, \ldots N$, having a reflectivity of *(1-1/i)* or transmittance of *1/i*, such that ~~the~~ <u>a</u> first light channel is substantially not affected by the front facet and the other *(N-1)* light channels are differently affected by the *(N-1)* beam splitting regions, respectively; the rear facet includes a highly reflective region; and dimensions of said regions of the front and rear facet and orientation of the plane parallel plate with respect to the light channels' propagation axis are such that light is <u>repetitively</u> reflected <u>back and forth between</u> ~~from~~ the highly reflective region ~~towards~~ <u>and</u> the beam splitting region~~, reflected back from the beam splitting region to the highly reflective region and so on~~.

70. (Currently Amended) A beam coupler element ~~for use in a resonator cavity~~ for controlling light propagating through ~~the~~ a resonator cavity to provide at least two phase locked output light channels of desired transverse and longitudinal modes, the beam coupler assembly comprising: a plane parallel plate with its front and rear facets being patterned to have regions of predetermined transmission [[or]] and ~~reflectivities~~ reflectivity, wherein: the front facet includes a substantially transmitting region and at least one predetermined beam splitting region; the rear facet includes at least one predetermined beam splitting region; and dimensions of said regions of the front and rear facets and orientation of the plane parallel plate with respect to the light channels' propagation axis are such that light enters the beam coupling element through said regions of the front facet and is reflected from the beam splitting region of the rear facet towards the beam splitting region of the front facet and ~~*vice versa*~~ back to the beam splitting region of the rear facet.

71-72. (Canceled)